ABSTRACT OF THE DISCLOSURE

A method for producing single layer or multilayer films with high thickness uniformity or thickness gradients. The method utilizes a moving mask which blocks some of the flux from a sputter target or evaporation source before it deposits on a substrate. The velocity and position of the mask is computer controlled to precisely tailor the film thickness distribution. The method is applicable to any type of vapor deposition system, but is particularly useful for ion beam sputter deposition and evaporation deposition; and enables a high degree of uniformity for ion beam deposition, even for near-normal incidence of deposition species, which may be critical for producing low-defect multilayer coatings, such as required for masks for extreme ultraviolet lithography (EUVL). The mask can have a variety of shapes, from a simple solid paddle shape to a larger mask with a shaped hole through which the flux passes. The motion of the mask can be linear or rotational, and the mask can be moved to make single or multiple passes in front of the substrate per layer, and can pass completely or partially across the substrate.